

# New Jersey's Clean Energy Program

LGEA Exit Meeting for:

Shrewsbury Borough Board of Education

> Brian Dattellas March 20, 2018

> > NJCleanEnergy.com





#### Introductions

- Overview of LGEA process (application to deliverable)
- Energy use & existing conditions
- Review of Energy Conservation Measures (ECMs) identified
- Questions or concerns regarding the draft audit report
- Overview of NJCEP equipment incentives
- Next steps for Shrewsbury Borough Board of Education

## Introductions

#### Shrewsbury Borough BOE

- Business Administrator:
- Supervisor, Buildings & Grounds:
- Superintendent:
- Board President:
- Board Member (Chair of Facilities & Finance):
- Board Member:
- Board Member:

#### NJ Clean Energy Program Team

- Auditor:
- Outreach Manager:
- LGEA Program Manager:
- BPU Commissioner:
- ESIP Coordinator:

New Jersey's Cleanenergy

- Debi Avento
- Mike Tillett
- Brent MacConnell
- Pamela Hemel
- Don Sweeney
- Jessica Groom
- Becky Montgomery

Brian Dattellas Jim Friedl Brian DeLuca Dianne Solomon Mike Thulen

## **Process to Draft Report**



- Application submitted to NJCEP
- Site Visit Performed
- Utility Analysis
- Baseline Condition
- Analysis
- Recommendations
- Report

### Shrewsbury Borough School



#### **Overview of Systems, Baseline & Existing Conditions:**

- Building Envelope
- Lighting System
- HVAC and Mechanical Systems
- Generator (125kW) Emergency use only

#### **Utility Consumption:**

- Electric Consumption and Costs
- Natural Gas Consumption and Costs



### Shrewsbury Borough School

	Energy Conservation Measure	Recommend?	Annual Electric Savings (kWh)	Peak Demand Savings (kW)	Annual Fuel Savings (MMBtu)	Annual Energy Cost Savings (\$)	Estimated Install Cost (\$)	Estimated Incentive (\$)*	Estimated Net Cost (\$)	Simple Payback Period (yrs)**	CO <sub>2</sub> e Emissions Reduction (Ibs)
	Lighting Upgrades		246,908	26.5	0.0	\$30,650.73	\$95,718.09	\$17,560.00	\$78,158.09	2.5	248,635
ECM 1	Install LED Fix tures	Yes	35,134	3.8	0.0	\$4,361.43	\$27,876.59	\$900.00	\$26,976.59	6.2	35,379
ECM 2	Retrofit Fixtures with LED Lamps	Yes	211,613	22.7	0.0	\$26,269.29	\$67,626.39	\$16,660.00	\$50,966.39	1.9	213,093
ECM 3	Install LED Exit Signs	Yes	161	0.0	0.0	\$20.01	\$215.11	\$0.00	\$215.11	10.8	162
	Lighting Control Measures		1,200	0.1	0.0	\$149.02	\$2,060.00	\$280.00	\$1,780.00	11.9	1,209
ECM 4	Install Occupancy Sensor Lighting Controls	Yes	1,200	0.1	0.0	\$149.02	\$1,620.00	\$210.00	\$1,410.00	9.5	1,209
	Motor Upgrades		8,481	2.0	0.0	\$1,052.85	\$8,079.36	\$0.00	\$8,079.36	7.7	8,541
ECM 5	Premium Efficiency Motors	Yes	8,481	2.0	0.0	\$1,052.85	\$8,079.36	\$0.00	\$8,079.36	7.7	8,541
	Variable Frequency Drive (VFD) Measures		39,074	7.5	0.0	\$4,850.63	\$14,829.50	\$3,925.00	\$10,904.50	2.2	39,348
ECM 6	Install VFDs on Constant Volume (CV) HVAC	Yes	19,655	5.5	0.0	\$2,439.99	\$7,615.90	\$1,600.00	\$6,015.90	2.5	19,793
ECM 7	Install VFDs on Boiler Feedwater Pumps	Yes	19,419	2.0	0.0	\$2,410.65	\$7,213.60	\$2,325.00	\$4,888.60	2.0	19,555
	Electric Unitary HVAC Measures		3,435	2.0	0.0	\$426.43	\$52,781.59	\$2,415.50	\$50,366.09	118.1	3,459
ECM 8	Install High Efficiency Electric AC	Yes	3,435	2.0	0.0	\$426.43	\$52,781.59	\$2,415.50	\$50,366.09	118.1	3,459
	Gas Heating (HVAC/Process) Replacement		0	0.0	724.5	\$7,507.52	\$523,000.00	\$9,442.40	\$513,557.60	68.4	84,824
ECM 9	Install High Efficiency Hot Water Boilers (Option 2)	Yes	0	0.0	0.0	\$0.00	\$0.00	\$0.00	\$0.00	0.0	0
	TOTALS		299,100	38.1	724.5	\$44,637.19	\$696,468.55	\$33,622.90	\$662,845.65	14.8	386,015

\* - All incentives presented in this table are based on NJ Smart Start Building equipment incentives and assume proposed equipment meets minimum performance criteria for that program.

\*\* - Simple Payback Period is based on net measure costs (i.e. after incentives).

Overview of Existing Systems – Boilers (ECM #9)



- Mechanical system from the original construction utilizes a steam loop fed by two steam boilers
- Middle School wing uses the same boilers and via a heat exchanger, converts steam to hot water for this area of the building.
- Gym, Library and other distinct spaces utilize packaged roof top units (RTUs) for heating and cooling.
- Steam boilers are challenging and inefficient with the generation of steam, control, and distribution throughout a building.

Per a request from district staff, the energy audit report evaluated <u>two options</u> for upgrading the existing steam boilers.

**Option #1 for Replacement - Boilers** 



- Replace existing steam boilers with more efficient steam boilers
- Retains the existing infrastructure for steam distribution in the original building
- Minimal disruption in the classroom spaces
- Estimated payback of approximately 45 years, per analysis included in this audit.
- Long payback due to minimum efficiency gain on new steam boilers & costs

### **Option #2 for Replacement - Boilers**



- Replace existing steam boilers with high efficiency condensing hot water boilers
- A new hot water system could be up to 15% more efficient than the existing steam system and would be much easier to control
- Requires upgrades to pumping, controls, and comfort heating infrastructure.
- Estimated payback of approximately 68.4 years, per analysis included in this audit.
  - Long payback due to significant costs
  - Recommend working with a contractor to determine viability of project before pursuing
  - Disruption to school activity

**Option #2 for Replacement - Boilers** 



- If choosing this path forward, our recommendations are:
  - Replace existing steam boilers with gas-fired condensing hot water boilers
  - Convert system from steam to hot water
  - Replace terminal steam coils in unit ventilators with terminal hot water coils or new fan coils
  - Replace steam piping with hot water piping
  - Install hot water pumps and motors
- Additional Items for Consideration (requires engineering design input):
  - Proposed boiler and distribution system sizing and configuration
  - Proposed hot water device sizing and distribution system pipe sizing
  - Having the ability to operate the new system in condensing mode



### Solar Photovoltaic

- Preliminary screening based on some facility details indicated there is high potential for installing a PV array
- Some roof upgrades may be required before implementing a roof-mounted array

Potential	High	
System Potential	150	kW DC STC
Electric Generation	112,867	kWh/yr
Displaced Cost	\$9,820	/yr
Installed Cost	\$390,000	



### Some Energy Efficient Best Practices



- Reduce Air Leakage
- Check for and Seal Duct Leakage
- Close Doors and Windows
- Use Window Treatments/Coverings
- Turn Off Unneeded Motors
- Reduce Motor Short Cycling
- Use Fans to Reduce Cooling Load
- Clean Evaporator/Condenser Coils on AC Systems
- Repair/Replace Steam Traps
- Install Plug Load Controls
- Replace Computer Monitors
- Water Conservation

See Section 5 (pg 30) for a complete list of best practices

## **PROGRAM PORTFOLIO**





### ECM Incentive Program Eligibility



	Energy Conservation Measure	SmartStart Prescriptive	Direct Install	Pay For Performance Existing Buildings **
ECM 1	Install LED Fix tures	Х	Х	Х
ECM 2	Retrofit Fixtures with LED Lamps	Х	Х	Х
ECM 3	Install LED Exit Signs		Х	Х
ECM 4	Install Occupancy Sensor Lighting Controls	Х	Х	Х
ECM 5	Premium Efficiency Motors			Х
ECM 6	Install VFDs on Constant Volume (CV) HVAC	Х	Х	Х
ECM 7	Install VFDs on Boiler Feedwater Pumps	Х	Х	Х
ECM 8	Install High Efficiency Electric AC	Х	Х	Х
ECM 9	Install High Efficiency Hot Water Boilers	Х		Х

**\*\*** Although P4P has a 200kW minimum threshold for eligibility, this facility may still qualify because the peak kW demand is within 10% of the program's requirement to participate. We pursued this possible NJCEP path forward due to constraints on the Direct Install program for multiple measures related to boilers.



**Recommended NJCEP Incentives** 

### Direct Install

#### Hutchinson Mechanical Services Ed Hutchinson 856-429-5828 x215 edhutchinson@hutchbiz.com

Pay for Performance (P4P)\*\*

SmartStart Buildings (i.e Retrofit – Existing Buildings)

## **Direct Install: Overview**



- Turn-key retrofit program to replace outdated and inefficient equipment, including lighting, HVAC, refrigeration, etc.
- Open to Small to Mid-Sized Commercial and Industrial facilities with a peak electric demand ≤ 200 kW
- Provides incentives of up to 70% of the installed cost
- Incentives are paid directly to the contractor
  - Customer only pays remaining 30% of installed cost
  - \$125,000 project cap
  - \$250,000 per entity cap
- Participating contractors provide support and process all paperwork
- Fast turnaround time: Average length of time for job completion (4-6 months)



## **Direct Install – Financing Option**

- Eligible NJNG customers can <u>finance</u> <u>the remaining 30 percent balance</u> at 0% APR through the "SAVEGREEN Project<sup>®</sup> On-Bill Repayment Program" (OBRP) for 36 months.
- For measures that may not qualify for Direct Install, NJNG also offers financing options for SmartStart that will cover up to \$130,000 per year.





### **Direct Install – Financing Option**

• <u>Questions? Contact Jerry at the following</u>:

#### Jerry Ryan

Energy Efficiency Operations Manager New Jersey Natural Gas 732-433-4362 (cell) 732 378 4920 (office) jryan@njng.com







- Comprehensive, whole-building approach to saving energy in existing or new facilities
- Customer chooses from network of pre-approved participating Partners
- Incentives up to \$2 million per project
  - \$1 million for electric measures
  - \$1 million for gas measures
- \$4 million annual entity cap per fiscal year
- Incentives paid in three installments at milestones

### P4P EXISTING BUILDINGS: OVERVIEW



- Open to Commercial and Industrial facilities with annual peak demand 200 kW+ in previous year
- Incentives up to 50% of total project cost
- Minimum savings 15% from existing energy use
- At least two unique measures
- No more than 50% of total savings from lighting
- Lighting savings up to 70% may be considered with minimum savings target increasing up to 35%



### P4P Existing Buildings: PROCESS





# P4P Existing Buildings: INCENTIVES 🗐

	Incentive #1: Energ	y Reductio	n Plan
	Incentive Amount:	\$0.15	per sq ft
	Minimum Incentive:	\$7,500	
	Maximum Incentive:	\$50,000	or 50% of facility annual energy cost
	Incentive #2: Installation of	Recommen	nded Measures
	Minimum Performance Target:	15%	
<b>F1</b> • • •	Base Incentive based on 15% savings:	\$0.09	
Electric	For each % over 15% add:	\$0.005	per projected kWh saved
Incentives	Maximum Incentive:	\$0.11	
	Base Incentive based on 15 % savings:	\$0.90	
Gas Incentives	For each % over 15% add:	\$0.05	per projected Therm saved
	Maximum Incentive:	\$1.25	
	Incentive Cap:	25%	of total project cost
	Incentive #3: Post-Construct	tion Benchr	narking Report
	Minimum Performance Target:	15%	
Flastria	Base Incentive based on 15% savings:	\$0.09	
Liectric	For each % over 15% add:	\$0.005	per projected kWh saved
Incentives	Maximum Incentive:	\$0.11	
	Base Incentive based on 15% savings:	\$0.90	
Gas Incentives	For each % over 15% add:	\$0.05	per projected Therm saved
	Maximum Incentive:	\$1.25	
	Incentive Cap:	25%	of total project cost



#### Energy Savings Improvement Program (ESIP)

- Program administered directly by BPU
- Provides alternative financing for energy savings projects at public institutions.
- Value of energy savings leveraged to pay for cost of EE projects over a 15 year contract.
- Does <u>not</u> count as debt or require voter approval.
- Requires an audit as 1<sup>st</sup> step (LGEA satisfied this requirement)





## FOR MORE INFORMATION

## ESIP

Mike Thulen ESIP Coordinator Office: 609-777-3338 Cell: 732-330-2419 ESIP@bpu.nj.gov

NJCleanEnergy.com

### Questions



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### FOR MORE INFORMATION

Visit NJCleanEnergy.com Call (866) NJSMART

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